

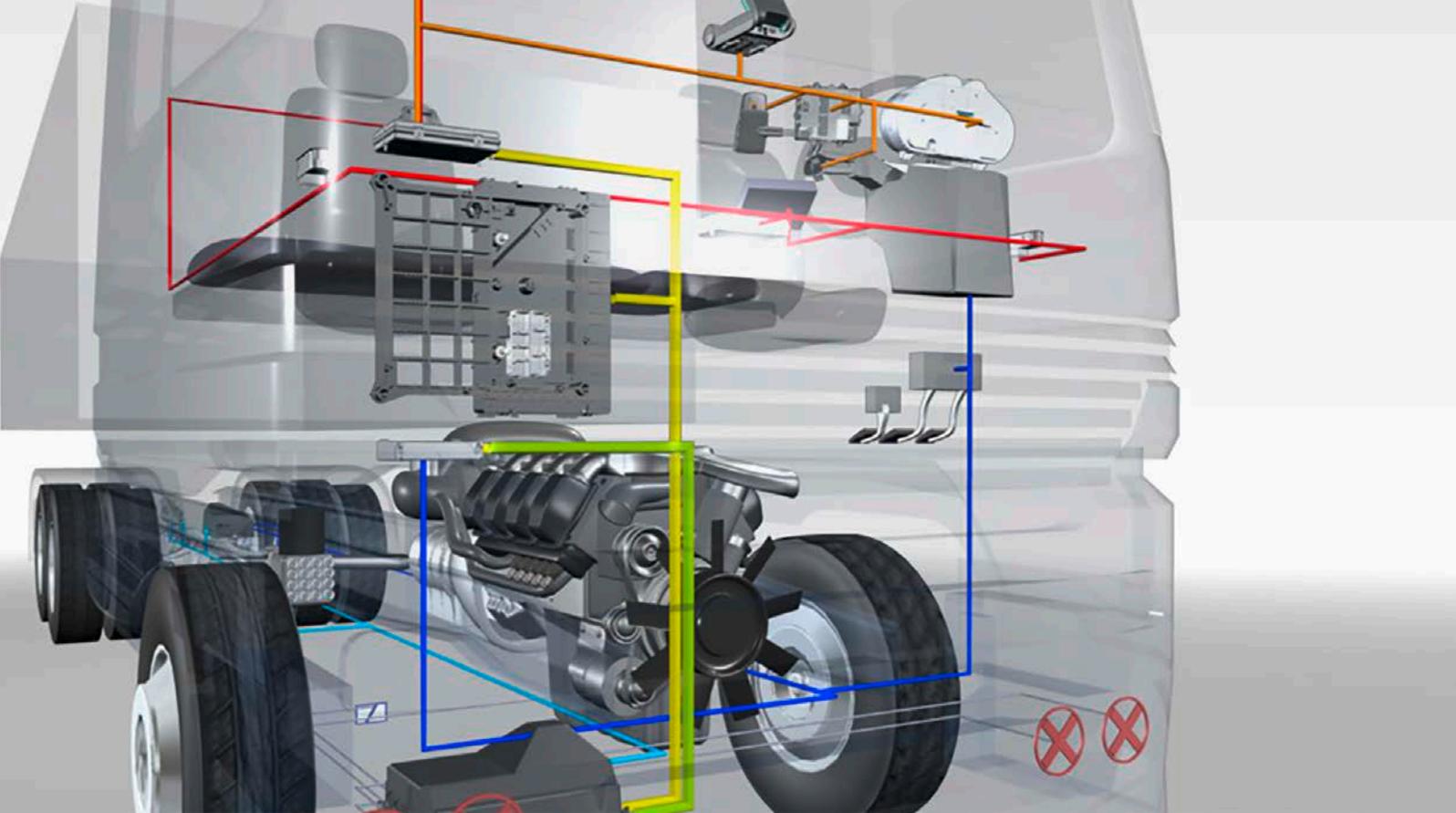


## Wired for performance

**New electronics architecture for commercial vehicles**







## ESCONET – reliably networked.

Our solutions for commercial vehicles reflect our special focus on service life and reliability as a way of increasing vehicle availability. This has a direct impact on lifecycle costs, thereby enhancing the value of the vehicle. We listen to the needs and concerns of commercial vehicle manufacturers and fleet operators and work closely with our customers to develop tomorrow's solutions.

Our Electronic Scope for Networks – ESCONET for short – is a prime example, enabling innovative electronics architectures that help to improve vehicle performance, safety and availability.

We are aware that commercial vehicles require specific technical solutions. The number of axles and auxiliary systems, as well as chassis lengths and cab sizes, translates into a wide range of variants. In addition,

development-related cost pressures and the desire for maximum operational reliability make tough demands on the technologies deployed in these vehicles. The testing criteria for the many electronic functions and the potential for cross influences have also grown considerably. Combined with shorter time to market, these factors mean that carrying out full testing for all possible application scenarios has become a real challenge.

## Recognizing borders.

The task is as follows: lean and cost-oriented electronics architectures with highest flexibility and availability. Only a target-oriented organized electronics architecture can meet these sophisticated requirements. By integrating local and effective hierarchies they provide concrete cost savings potentials with respect to wiring and reduction of plug connector transitions. In addition, we are not only looking at control devices and data buses, but also current and future electronic functions, new technologies and standards. For this purpose we utilize the bundled development know-how of the entire Continental group as well as our intensive cooperation with manufacturers of vehicle wiring.

The result is our ESCONET domain concept with its clearly defined, decentralized segments and a powerful backbone. Each domain has a powerful 32-bit multi-core Master Control Unit for handling processor-intensive tasks. The Master Control Unit also serves as a gateway to the other control computers and manages the flow of incoming and outgoing information.

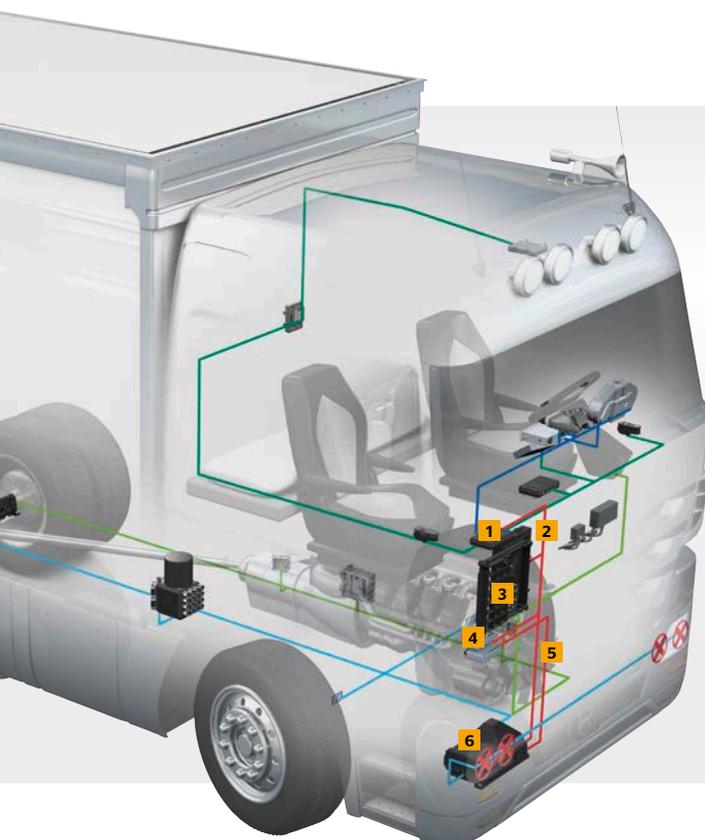
### Optimal communication

The advantages are clear: ESCONET replaces multiple communication links between individual control units with clear, hierarchical structures. With our new approach, the tried and true CAN data bus plays the

role of a messenger. As a fast, proven communication medium (500 kBit/s), it provides a reliable link between the four domains

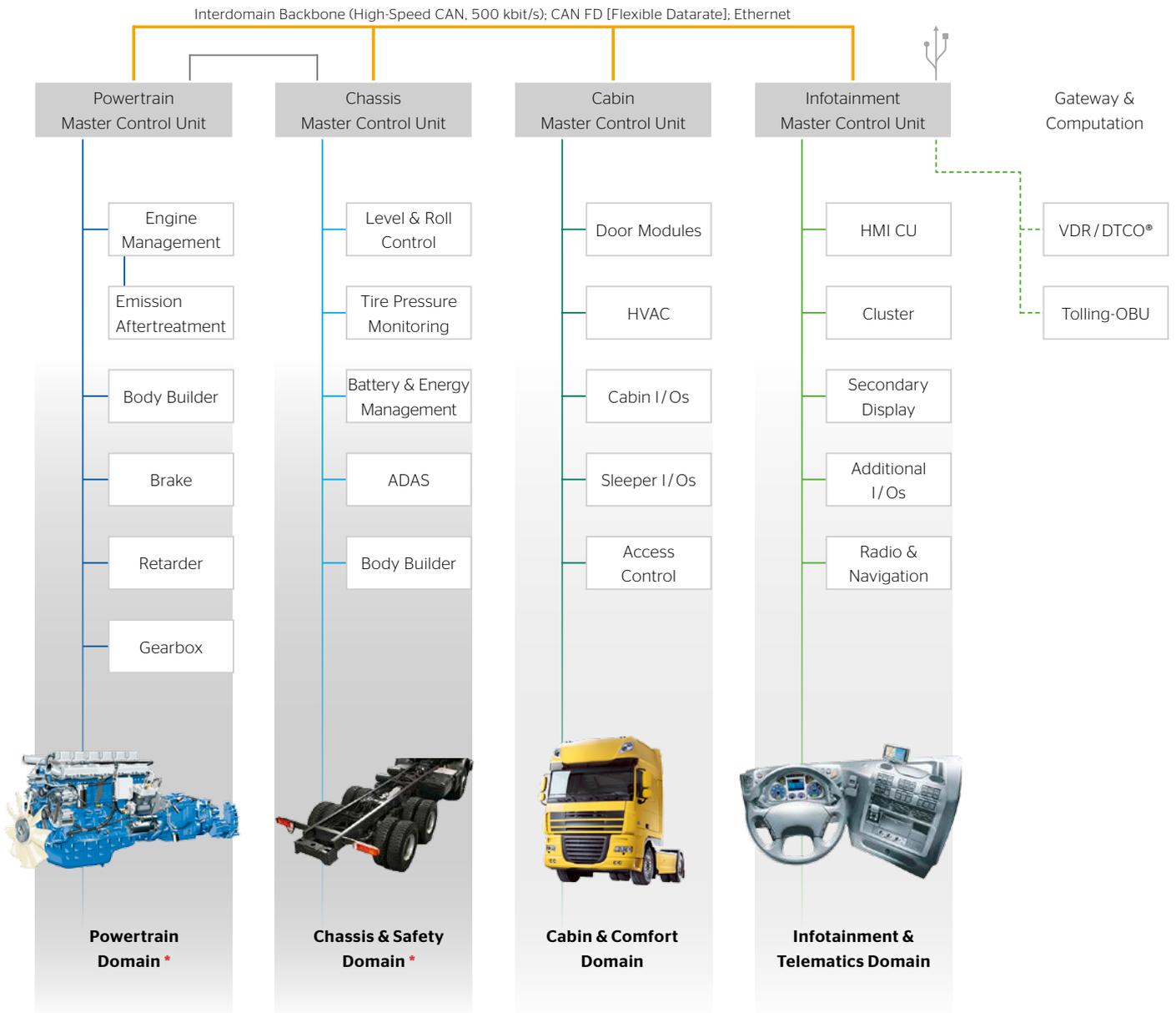
- Powertrain
- Chassis & Safety
- Cabin & Comfort
- Infotainment & Telematics

All data traffic flows via the CAN data bus. The two domains with the greatest safety relevance, Powertrain and Chassis & Safety, are connected by an additional high-speed CAN bus with the same high transfer rate. Other data bus links between the domains are no longer necessary. Information passed between the individual control units within a domain is also transported by CAN bus - at transfer rates of up to 500 kBit/s when using high-speed technology. Otherwise, a low-speed CAN or LIN data bus is used. The ESCONET architecture can be found already in different commercial vehicle applications and helps providing a flexible and easy expandable base for functional extensions. As member of the AUTOSAR consortium our operating systems are prepared for AUTOSAR compatible module integration. Also the newly defined Ethernet for Automotive standard will expand the data transfer capabilities on the backbone dramatically. CAN FD (Flexible Datarate) will be mainly used for fast downloading of software updates.



1. Infotainment Master Control Unit
2. Domain-spanning backbone  
(High-Speed CAN, 500 kbit/s; CAN FD [Flexible Datarate]; Ethernet)
3. Cabin Master Control Unit
4. Powertrain Master Control Unit
5. Redundant CAN bus
6. Chassis Master Control Unit

Example of a future-oriented, decentralized E/E architecture.



- Interdomain Backbone (High-Speed CAN, 500 kbit/s)
- Redundant CAN
- USB
- Powertrain Subnet (High-Speed CAN)
- Chassis Subnet (High-Speed CAN)
- Cabin Subnet (Low-Speed CAN)
- Infotainment Subnet
- \* Safety relevant

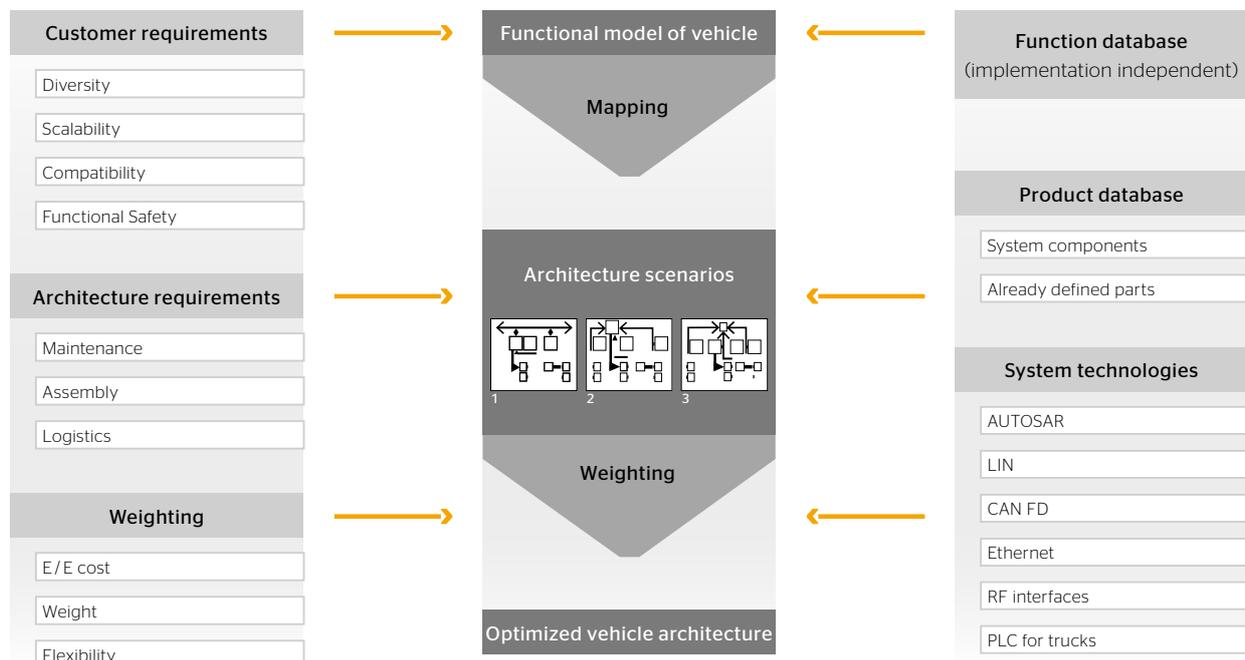
# Open for the toughest demands.

Our ESCONET requires only a minimum number of interfaces, thereby simplifying testing and development. At the same time, it benefits from greater reliability and reduced maintenance effort, while the rugged design of the overall system gives engineers and manufacturers greater freedom.

For example, the control units relating to a specific domain can be distributed around the vehicle - close to each individual function. This eliminates substantially the wiring and reduces development work. Less wiring also means reduced weight and, therefore, a larger payload. A "weighty" argument in the transport industry. Additionally, ESCONET supports all classes of commercial vehicles. Whether it's a low-end truck with a limited specification or a high-end truck with a broad range of functionalities, the individual functions can also be grouped into just two or three domains, depending on customer requirements. Our engineers use the PREEvision® computer-assisted simulation tool to determine the optimal number by sketching out function- and cost-optimized electrical and electronic network architectures for a variety of scenarios. All that is needed is a detailed list of the actuators, functions and sensors required, which we as system designer draw up together with the vehicle manufacturer.

With ESCONET, customized electronics architectures can be scaled to suit the special requirements of regional commercial vehicle markets - the only defining factors are the number of domains and the software configuration. For projects like these, Continental can leverage a modular system comprising carefully matched components and assemblies. This allows fast, cost-effective configuration of 12 and 24 volt electrical systems and standard networking solutions. Our customers also benefit from our years of experience in the fields of tachographs, instrumentation, navigation systems and electronic solutions for the safety and drive components of commercial vehicles. Using this expertise, we can realize not only standard cockpits, but also high-tech information and control systems.

## Use of the PREEvision® simulation tool to determine the most efficient network architecture for the specific vehicle



# Minimal maintenance, maximum performance.

The central element of ESCONET are high-performance 32-bit control computers with an integrated mathematical coprocessor that are located in the individual domains. With their massive computing performance, they enable smooth execution of complex algorithms. In the event of faults, control units can be replaced without the need to set parameters. This is a plug and play process and the units are self-configuring. This maintenance-friendly concept will be particularly attractive to markets where not every workshop is fully equipped, such as in Asia or Africa.

The high computational performance of the calculators also allows an integration of multiple functions to limit the number of control units within the vehicle: For example, tire pressure monitoring can be integrated into the existing chassis control device and can therefore replace a previously separate control unit. The same applies for the legally required introduction of ESP systems, which require an additional yaw rate sensor on the vehicle chassis: A yaw rate sensor can be integrated into an existing chassis module in a cost-efficient manner, without the need for additional space.

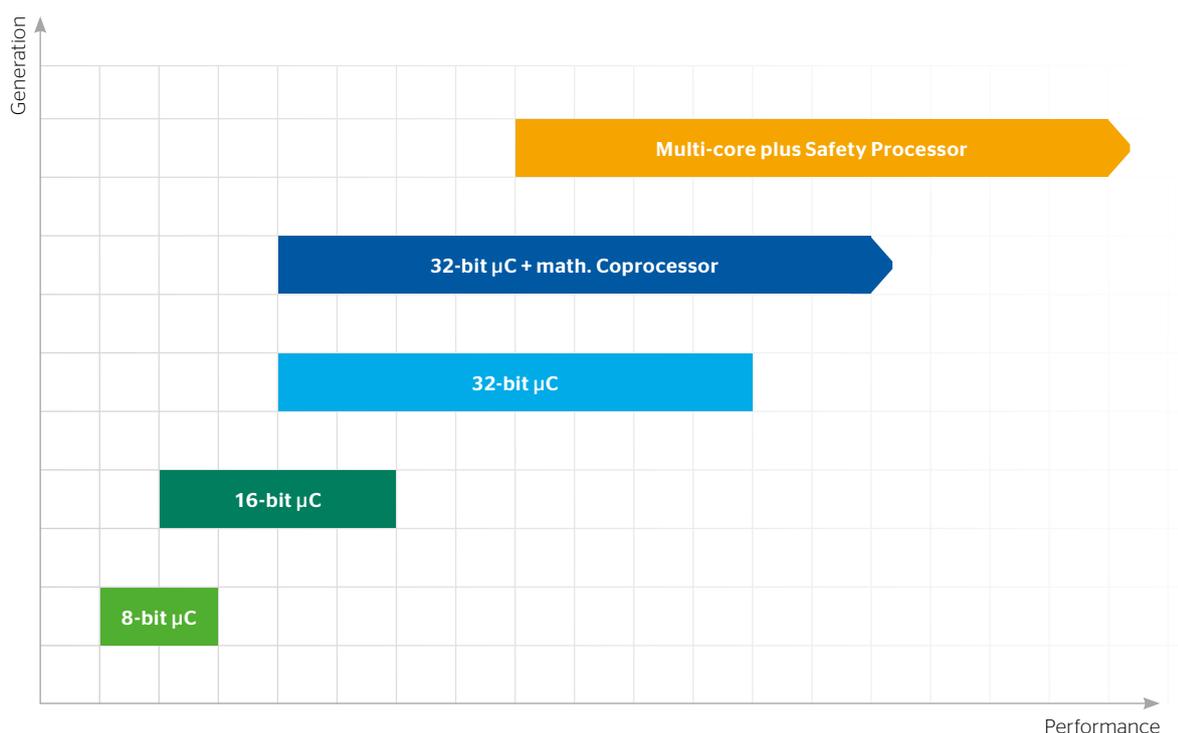
The robust mechanical design of the ECUs allows decentralized deployment, in accordance with the ESCONET concept. This approach provides the basis for future innovations in the world of commercial vehicles.

The new functions offer commercial vehicle manufacturers a variety of fascinating options. For example, three-dimensional navigational data from the eHorizon® can be linked with the driving strategy of the vehicle and the trucks' automated transmission. As a result, the Drivetrain Controller knows in advance, which terrain profile will be expected after the curve and is able to select the optimal engine power and gear ratio for a more dynamic drive and less fuel consumption. In addition, it would be possible to prevent potentially critical driving situations in advance. Through our intensive cooperation with manufacturers and operators of commercial vehicles and our partners in the respective specialist areas we have developed the knowledge and competence to develop these types of comprehensive electronic all-in-one solutions.

Air pressure management is another example of an innovative solution: Together with our partners we supply intelligent air pressure management, electronic control of vehicle levels and hence for the first time allow for level and pressure measurements in the suspension bag which are free of wear and tear as well as maintenance. As in other segments, the same principle also applies here: From innovation to implementation - all solutions from one provider.

In accordance with our slogan "Progressing with our customers", ESCONET has created a solution of utmost flexibility, availability and modularity.

## Significantly superior computing performance thanks to 32-bit Master Control Units



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